REMARKS

This paper is filed in response to the Office Action mailed June 17, 2010 (the "Office Action"). Claims 2-7, 9-15, and 38 were rejected under 35 U.S.C. § 112 ¶ 2 as allegedly being indefinite. Claims 1-7 were rejected under 35 U.S.C. § 101 as allegedly being directed to unpatentable subject matter for not being tied to a particular machine and for not transforming a particular article to a different state or thing. Claims 33-38 were rejected under 35 U.S.C. § 101 as allegedly being directed to unpatentable subject matter for claiming a pure signal. Claims 1-15 and 33-38 were rejected under 35 U.S.C. § 103(a) as allegedly being obvious over U.S. Patent 6,002,184 to Delson et al ("Delson") in view of U.S. Patent No. 6,005,551 to Osborne et al ("Osbourne"), U.S. Patent No. 6,625,576 to Massie et al ("Massie"), and U.S. Patent No. 5,754,023 to Roston et al ("Roston").

Applicant has amended claims 1-7, 9-15, and 33-38. No new matter is added by these amendments and support may be found in the specification and claims as originally filed.

Applicant respectfully traverses each of the bases for rejection and requests reconsideration and allowance of all claims in view of the amendments above and the remarks below.

I.   § 112 ¶ 2 – Claims 2-7, 9-15, and 38

Claims 2-7, 9-15, and 38 were rejected under 35 U.S.C. § 112 ¶ 2 as allegedly being indefinite.

Claims 2-7 and 9-15 were rejected for reciting "[a] method as recited in" or "[a] system as recited in," respectively. Applicant has amended claims 2-7 to recite "[t]he method of" rather than "[a] method as recited in." Applicant has amended claims 9-15 to recite "[t]he system of" rather than "[a] system as recited in." And while claims 34-38 were not similarly rejected, Applicant has amended claims 34-38 to recite "[t]he non-transitory computer-readable medium" rather than "[a] method as recited in." In view of the foregoing amendments, Applicant respectfully requests the Examiner withdraw the rejection of claims 2-7 and 9-15.

Claims 6, 14, and 38 were rejected for reciting "the extent of motion of the manipulandum," which lacked antecedent basis. Claim 14 was further rejected for reciting "the range of motion of the manipulandum." Applicant has amended each of these claims to recite

"an extent of motion of the manipulandum." Applicant has further amended claim 14 to recite "a range of motion of the manipulandum." In view of the foregoing amendments, Applicant respectfully requests the Examiner withdraw the rejections of claims 6, 14, and 38.

Claim 12 was rejected for lacking a structural cooperative relationship for "a relative digital encoder" as it would allegedly be unclear to one of skill in the art "what the digital encoder is intended to be relative to."[1] Respectfully, one of skill in the art would recognize a relative digital encoder to be a type of digital encoder that senses relative positions, etc. rather than absolute positions, etc. As such, Applicant asserts that claim 12 satisfies 35 U.S.C. § 112 ¶ 2. Applicant respectfully requests the Examiner withdraw the rejection of claim 12.

II.   § 101 – Claims 1-7

Applicant respectfully traverses the rejection of claims 1-7 under 35 U.S.C. § 101 as allegedly being directed to non-statutory subject matter.

Applicant has amended claim 1 to recite that the each of the method steps is performed "using a processor," which ties the steps of the method claim to a processor, i.e. a particular machine. Applicant has also made similar amendments to dependent claims 3 and 5-7. Because claims 1-7 are each tied to a particular machine, Applicant respectfully requests the Examiner withdraw the rejection of claims 1-7.

III.   § 101 – Claims 33-38

Applicant respectfully traverses the rejection of claims 33-38 under 35 U.S.C. § 101 as allegedly being directed to non-statutory subject matter.

A claim that covers a "transitory, propagating signal," such as a "transitory electrical and electromagnetic signal[] propagating through some medium, such as wires, air, or a vacuum," is not directed to patentable subject matter.[2] Thus, Applicant has amended claims 62-67 to recite "non-transitory" computer-readable media. The USPTO has noted that computer-readable medium claims that cover "both transitory and non-transitory embodiments may be amended to narrow the claim to cover only statutory embodiments to avoid a rejection under 35 U.S.C. § 101 by adding the limitation 'non-transitory' to the claim."[3] Further, the USPTO has noted that

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[1] Office Action at 4.
[2] In re Nuijten, 500 F.3d 1346, 1352, 1357 (Fed. Cir. 2007).
[3] Exhibit A (Subject Matter Eligibility of Computer Readable Media, signed by Director Kappos on Jan. 26, 2010).

"[s]uch an amendment would typically not raise the issue of new matter, even when the specification is silent because the broadest reasonable interpretation relies on the ordinary and customary meaning that includes signals *per se*. The limited situations in which such an amendment could raise issues of new matter occur, for example, when the specification does not support a non-transitory embodiment because a signal *per se* is the only viable embodiment such that the amended claim is impermissibly broadened beyond the supporting disclosure."[4]

For the purposes of this application, the term "non-transitory" is intended to encompass computer-readable media as defined within the present specification and those that would otherwise be known to one of skill in the art, but excludes transitory, propagating signals as defined in Nuijten. The specification provides multiple examples of non-transitory computer readable media, including "RAM and ROM," "hard disk drive, CD ROM drive, floppy disk drive," etc.[5] Each of these is a non-transitory computer-readable medium. Further, given the USPTO's position that (a) such an amendment obviates a rejection under 35 U.S.C. § 101, and (b) that such an amendment does not constitute the addition of new matter so long as non-transitory embodiments are disclosed, Applicant respectfully asserts that amended claims 33-38 are directed to patentable subject matter. Therefore, Applicant respectfully requests the Examiner withdraw the rejection of claims 33-38.

IV.   § 103(a) – Claims 1-15 and 33-38 – Delson in view of Osborne, Massie, and Roston

Applicant respectfully traverses the rejection of claims 1-15 and 33-38 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Delson in view of Osborne, Massie and Roston.

To anticipated a claim under 35 U.S.C. § 102, a reference must disclose each and every element of the claimed invention.[6]

To establish *prima facie* obviousness of a claimed invention under 35 U.S.C. § 103(a), the Office Action must show, either from the references themselves or in the knowledge generally available to one of ordinary skill in the art, that the cited references disclose or suggest each claimed element.[7]

The Office Action provides several alternative rejections of claim 1:

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[4] Id.
[5] Specification, ¶ 141.
[6] See M.P.E.P. § 2131.
[7] See MPEP §§ 2141 and 2143; Graham v. John Deere Co., 383 U.S. 1 (1966); KSR Int'l Co. v. Teleflex, Inc., 550 U.S. 398 (2007).

(1) Anticipation by Delson (presumably under 35 U.S.C. § 102)

(2) Obvious over Delson in view of Osborne

(3) Obvious over Delson in view of Osborne and Massie

(4) Obvious over Delson in view of Osborne, Massie, and Roston

However, the Office Action fails to state a *prima facie* case of anticipation or obviousness for each basis of rejection.

<u>Alleged Anticipation of Claim 1 by Delson</u>

The Office Action's rejection of claim 1 over Delson fails to state a *prima facie* rejection for anticipation because it does not cite to a portion of Delson that discloses or suggests calculates an adjusted sensor value "based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum" nor does it provide any explanation for why the cited portion teaches or suggests such a feature:

> "calculating an adjusted sensor value *[e.g., Fig. 21: δx]* based at least in portion the raw sensor value and a compliance between the sensor and the manipulandum."[8]

The rejection provides a citation to Figure 21 of Delson, specifically to the portion of the diagram labeled "δx." However, as described in the specification, δx does not represent an adjusted sensor value. Rather, δx discloses the difference between the sensed position of a driven system with the desired position.[9] The difference, δx, is used to modify a drive signal to move the driven system to reduce the difference, δx, to 0. In other words, this portion of Delson describes a very basic feedback control system. The error, or difference, disclosed by Delson is not a sensor signal and does not represent a modification to the raw sensor signal. The value δx is calculated based on the raw sensor signal, which is assumed to be accurate (or else the value of δx would be incorrect and the control system would operate incorrectly).

In contrast, the present specification discloses modifying the raw sensor signal based on a compliance between the sensor and the manipulandum. Some sensors provide inaccurate position sensing because of compliance that occurs naturally within the sensed system or within the sensors themselves. Compliance occurs in some instances because of poorly-fitted components or flex inherent within some transmission systems. For example, the specification

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[8] Office Action at 7.
[9] Delson, 35:40-44.

discloses that an "actuator may output a vibration on the manipulandum; the sensor would sense the actuator shaft rotating alternatingly in two directions at a particular frequency. However, the compliance in the transmission system may "absorb" the vibration forces such that the manipulandum does not actually move in physical space at all. The sensor would thus be sensing motion when no motion of the manipulandum actually occurs."[10] Thus, the raw sensor signal incorrectly indicates movement of the manipulandum. The specification discloses adjusting the raw sensor signal to compensate for the compliance. Such a compensation could be advantageously used in the Delson system to provide a more accurate sensor signal to compute δx, but δx itself is not an adjusted sensor signal. Delson does not disclose adjusting the signal from sensor 2552 at all. Thus, Delson cannot disclose adjusting the sensor signal "based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum" as recited in claim 1. Thus, Delson does not disclose "using a processor to calculate an adjusted sensor value based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum" and cannot anticipate claim 1.

Alleged Obviousness of Claim 1 in view of Delson and Osborne

The Office Action's rejection of claim 1 over Delson and Osborne fails to state a *prima facie* rejection for obviousness because it does not cite to a portion of Osborne that discloses or suggests calculates an adjusted sensor value "based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum" nor does it provide any explanation for why the cited portion teaches or suggests such a feature. As was discussed above, Delson does not disclose such a feature. Further, the Office Action only provides a cite to Osborne relating to "calculating an adjusted sensor value" and no citation to Osborne indicating any alleged disclosure where the adjusted sensor value is "based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum:"

> "calculating an adjusted sensor value *[e.g., Fig. 4: 108]* based at least in part on
> the raw sensor value and a compliance between the sensor and the
> manipulandum."[11]

The Office Action also fails to explain why the cited portion of Osborne allegedly discloses the claimed feature.

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[10] Specification, ¶ 58.
[11] Office Action at 7.

In contrast, claim 1 recites "calculating an adjusted sensor value <u>based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum</u>." (emphasis added). The cited portion of Osborne does not discuss compliance between a sensor and a manipulandum. Instead, it merely discloses filtering position and velocity values "to reduce errors induced by noise." Noise filtering is not the same as "using a processor to calculate an adjusted sensor value based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum" and there is no indication or suggestion that noise filtering could include "using a processor to calculate an adjusted sensor value based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum." Thus, the rejection fails to state a *prima facie* case of obviousness.

Alleged Obviousness of Claim 1 in view of Delson, Osborne, and Massie

The Office Action's rejection of claim 1 over Delson, Osborne and Massie fails to state a *prima facie* rejection for obviousness because it does not cite to a portion of Massie that discloses or suggests calculates an adjusted sensor value "based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum" nor does it provide any explanation for why the cited portion teaches or suggests such a feature. As was discussed above, Delson and Osborne do not disclose "using a processor to calculate an adjusted sensor value based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum." Further, the Office Action only provides a cite to Massie relating to "calculating an adjusted sensor value" and no citation to Massie indicating any alleged disclosure where the adjusted sensor value is "based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum:"

> "calculating an adjusted sensor value *[e.g., Fig. 5: angles, representation of position, velocity. etc.]* based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum."[12]

Figure 5 does not show or otherwise disclose adjusting a sensor value, nor does Figure 5 disclose or suggest "an adjusted sensor value based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum" as recited in claim 1. The identified quantities (angles, etc.) do not disclose a compliance between the sensor and the manipulandum

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[12] Office Action at 8.

and do not disclose calculating an adjusted sensor value. Thus, the rejection fails to state a *prima facie* case of obviousness.

<u>Alleged Obviousness of Claim 1 in view of Delson, Osborne, Massie, and Roston</u>

The Office Action's rejection of claim 1 over Delson, Osborne, Massie, and Roston fails to state a *prima facie* rejection for obviousness because it does not cite to a portion of Massie that discloses or suggests calculates an adjusted sensor value "based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum" nor does it provide any explanation for why the cited portion teaches or suggests such a feature. As was discussed above, Delson, Osborne, and Massie do not disclose "using a processor to calculate an adjusted sensor value based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum." Further, the Office Action only provides a cite to Roston relating to "calculating an adjusted sensor value" and no citation to Roston indicating any alleged disclosure where the adjusted sensor value is "based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum:"

> "calculating an adjusted sensor value *[e.g., Fig. 5: e(t), u(t)]* based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum."[13]

The cited Figure in Roston, like the Figure cited in Delson, is a basic feedback control diagram. There is no indication that a sensor signal is adjusted at all, let alone "based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum." The e(t) and u(t) functions cited by the Examiner are not adjusted sensor signals and are not "based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum." Thus, the rejection fails to state a *prima facie* case of obviousness.

For the foregoing reasons, the bases of rejection of claim 1 are in error and Applicant respectfully requests the Examiner withdraw the rejection of claim 1. Because, similar to claim 1, independent claim 8 recites "calculate an adjusted sensor value based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum" and claim 33 recites "calculating an adjusted sensor value based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum," the rejections of claims 8 and 33 are

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[13] Office Action at 9.

similarly deficient. Applicant respectfully requests the Examiner withdraw the rejection of claims 8 and 33.

Because claims 2-7, 9-15, and 34-38 each depend from and further limit one of claims 1, 8, or 33, the rejections of each of claims 2-7, 9-15, and 34-38 are in error and Applicant respectfully requests the Examiner withdraw the rejection of claims 2-7, 9-15, and 34-38.

CONCLUSION

Applicant respectfully asserts that in view of the amendments and remarks above, all pending claims are allowable and Applicant respectfully requests the allowance of all claims.

Should the Examiner have any comments, questions, or suggestions of a nature necessary to expedite the prosecution of the application, or to place the case in condition for allowance, the Examiner is courteously requested to telephone the undersigned at the number listed below.

Respectfully submitted,

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